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EXAMINER

RAMSEY, KENNETH J

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

Paper No. 10

Application Number: 09/386,972  
Filing Date: August 31, 1999  
Appellant(s): MORADI, BEHNAM

Danny L. Williams  
For Appellant

**MAILED**

OCT 31 2002

EXAMINER'S ANSWER

**GROUP 2800**

This is in response to the appeal brief filed August 26, 2002

A statement identifying the real party in interest is contained in the brief.

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

The statement of the status of the claims contained in the brief is correct.

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

The summary of invention contained in the brief is deficient because a critical omission is appellant's interpretation of the phrase "operating the field emission device in a pressure of at most about  $10^{-8}$  Torr for at least approximately 15 minutes". As per appellant's specification, page 9, lines 14-19 which forms the sole description of this step, "at most about  $10^{-8}$  Torr" comprises operating the device at "very low pressure, also in a range of approximately  $10^{-7}$  Torr to  $10^{-8}$  Torr...". See also appellant's specification, page 4, lines 1-9, which uses the phrase, "at most about  $10^{-8}$  Torr" to summarize the same description. Thus "at most about  $10^{-8}$  Torr" includes pressures as low as  $10^{-7}$  Torr. Also, while appellant stated in the specification, page 8, lines 11-16, that "conventionally manufactured field emission devices running under standard conditions of  $10^{-5}$  Torr to  $10^{-6}$  Torr showed severed tip degradation, he did not characterized what procedures were involved in the process of making the conventional tube or whether means such as a getter was employed to protect the cathodes from degradation in appellant's device.

The appellant's statement of the issues in the brief is correct.

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The rejection of claims 2, 4-7, 10, 11, 13, 14, 16, 17, 19, 20, 22, 23 and 25-33 (all claims under appeal) stands or falls together because appellant's brief does not contain a statement that this grouping of claims does not stand or fall together and reasons in support thereof. See 37 CFR 1.192(c)(7).

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(9) Prior Art of Record**

6,042,441	Konuma	3-2000
5,564,958	Itoh et al (Itoh)	10-1996
5,827,102	Watkins et al (Watkins)	10-1998

**(10) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

Claims 2, 4-7, 10, 11, 13, 14, 16, 17, 19, 20, 22, 23 and 25-33 (all claims under appeal) are rejected under 35 U.S.C. 103(a) as being unpatentable over Konuma in view of Itoh and Watkins. Konuma, figure 3 and column 5, lines 1-52, discloses a process of evacuating a field emission device (in this case a cathode ray tube having micro-field emitters as the cathode, see lines 42-44) comprising all of the process steps of claim 4 in the same manner as disclosed and claimed by appellant except for the time period of the operating step. The apparent reason why Konuma limits the time period of operating the device during evacuation is that Konuma limits the operating current and time to protect the cathode from damage due to sputter cleaning thereof (column 7, lines 17-26). It is also significant that Konuma, in the sentence bridging

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columns 6 and 7 teaches that the degree of pressure in the CRT should be from  $10^{-7}$  Torr to  $10^{-9}$  Torr apparently for the purpose of removing as harmful gas atoms as feasible in order to prevent damage the cathode due to ion bombardment. Thus Konuma clearly teaches "operating the field emission device in a pressure of at most about  $10^{-8}$  Torr" [albeit for a shorter time] to "remove at least a portion of materials from within said field emission device" as recited in claim 4. The only difference is the amount of time, that obviously varies based upon the nature of the device and the amount of cleaning that can be sustained without damage to the cathodes. Konuma column 7, lines 56-59, states that his cleaning process can also be applied to cleaning and evacuating the parts of a flat display panel as well as a CRT. Although, Konuma does not disclose the amount of "cleaning" for a flat panel display, Itoh clearly teaches cleaning flat panel field emission devices comprising a series of cleaning cycles each of which comprises introducing a purging gas into the tube, reducing the pressure to  $10^{-7}$  Torr, then "feeding the display device 2 with electricity for a few or several minutes [operating the device] while carrying out evacuation of the display device" (Itoh, paragraph bridging columns 6-7, emphasis added). It is not surprising that the Itoh step of operating the device could be extended over a further period of time than in Konuma because of the different nature of the devices. In a CRT a single cathode is assigned to each pixel of the same color but in a flat panel display each pixel has a distinct cathode associated therewith which cathode is operated only intermittently (whenever the pixel is refreshed). Thus a far longer period of operating a flat panel device will still result in less damage to a cathode of a flat panel display than to a cathode of a CRT. It also will

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take a longer time to clean each cathode of a flat panel display due to the intermittent energizing of each cathode. Itoh has not been relied upon as a primary reference since the reference appeared to teach away from the claimed invention as it was not noted that his teaching of reducing the pressure to less than  $10^{-7}$  Torr, "feeding the display device 2 with electricity for a few or several minutes [operating the device] while carrying out evacuation, introducing a purging gas and evacuating; and repeating these steps several times approximated so closely a teaching of "operating the field emission device in a pressure of at most about  $10^{-8}$  Torr for at least approximately 15 minutes to remove at least a portion of materials from within said field emission device". However, Konuma (which teaches operating a flat panel display device at a pressure as low as  $10^{-9}$  Torr to discharge absorbed gases from the cathode) as further taken in view of Itoh and Watkins (teaching soaking the flat panel display device at  $10^{-8}$  Torr for at least 2 hours), clearly suggests that a during the period in which the vacuum for is significantly lower, e.g. substantially less than  $10^{-7}$  Torr, there not be as many of the harmful gases and thus the flat panel devices could be cleaned for a longer time period since the amount of gas ions that could damage the cathodes would be less. Thus the teaching of Itoh of operating the flat panel display several times for a period of a few or several minutes each time after removing most of the harmful gas atoms when combined with the higher degree of vacuum suggested by Konuma and Watkins would have suggested the extended period of operating the device as recited in appellant's claims. As stated in the final rejection, the amount of time for which the out gassing step should be carried out varies according to the specifics of the involved manufacturing process and the

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desired results and would have been determined by standard tests that are obvious and routine in the art. Therefore, since the references fairly suggest evacuating a flat panel field emission device to at least  $10^{-8}$  Torr for at least approximately 15 minutes, and since Konuma and Itoh suggest that the period of operating the device should obviously be carried out during the lowest possible vacuum to protect the cathodes from damage, a step of operating the device in such a vacuum prior to sealing as recited in claims 4 and 5 is suggested. Thus claims 4 and 5 are clearly unpatentable. Similarly, claim 2 is unpatentable since the degree of vacuum is clearly taught. As to claims 6 and 7, either mode of evacuation and pinching the evacuating tube is well known in the art and obvious. For instance Itoh, figure 1, discloses an evacuation tube connected to evacuate the display panel rather than to evacuate the furnace atmosphere as per claim 7 and Watkins discloses evacuating the furnace such that the peripheral seal when made encloses a vacuum as per claim 6. As to claim 10, since manufacturing process are well known to cause contamination of the work (as appellant has admitted by failure to at any time challenge the Official notice of this fact in taken by the examiner in the first Office action), it is obvious to clean the parts prior to assembly. As to claim 11, the display device when evacuated as per Itoh, figure 1, must have a hole in one of the substrates, either of which would have been an obvious choice to one of ordinary skill in the art. Claims 13, 14 and 28-31 merely repeat various forms of the above claimed subject matter and are obvious for the reasons stated above. Claims 16, 17, 19, 20, 22, 23, 25-27, 32 and 33 are unpatentable since the appellant has shown no

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difference between the display devices as manufactured by the process therein and that of Konuma as modified by the teachings of Itoh and Watkins.

**(11) Response to Argument**

Appellant argues that Itoh teaches away from the claim process since Itoh states that operating the device while evacuating the device fails to sufficiently improve the life of the device but that a process of repeatedly introducing gas and purging remarkably improves the life of the device. In fact Itoh finds fault with both processes and teaches that repeating several time the steps of evacuating, operating, introducing a purging gas prior to a final evacuation results in a more improved life of a display. See Itoh, column 2, lines 31-43, and column 6, lines 58-63 and his teaching referenced above. Nowhere, has appellant shown that his process results in a field emission device having a significantly extended life beyond that of the devices made by the processes that Itoh disparages, nor does the improved process of Itoh teach away from the claimed invention, since it would be expected that the prior art devices would have a satisfactory life for the amount of money spent.

Appellant further argues that Konuma is silent with respect to the issue of materials out gassed from the anode during normal operation of the CRT. In fact the teaching of employing a getter in Konuma is an acknowledgement that gases may be out gassed during normal operation of the CRT. If there were no gases to be out gassed there would be no need to include a getter. The purpose of the degassing steps of the prior art including the process of Konuma is to remove sufficient gasses from the device so that the getter will be sufficient to protect the life of the tube. Moreover,



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degassing of the anode during the step of operating the device is inherent. See Itoh, column 2, lines 36-39.

At, page 8, lines 1-2 of the brief, appellant argues that Konuma teaches away from the claimed invention since he operates the device at a lower voltage. This argument is without merit since the specification and claims do not specify the voltage at which the display device is operated. Further, as shown by Itoh, there is not such a degree of concern re damage of the cathodes of a flat panel display when operated for a time period substantially greater than that of a CRT, particularly when the step of operating the device is interrupted periodically to remove the harmful gasses.

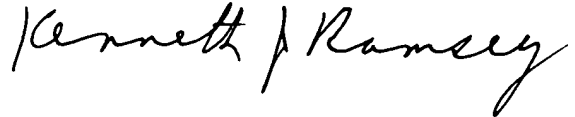
At page 8, lines 3-12, appellant argues that Itoh teaches that contrary to appellant's invention, the examiner's proposed modification would not be successful. This is not true. Itoh was not satisfied with the lifetimes of display devices made by the prior art. Therefore Itoh added a step to the prior art process that enabled it to be preformed for a longer time period without damaging the cathodes. At no point, however, did Itoh state that the claimed invention would not be suitable for its intended purpose, i.e. result in a tube with extended life and greater current stability contrasted to "conventionally manufactured FEDs" as set forth at page 8, lines 11-16 of appellant's specification. If this were true there would be no point in operating the device during evacuation at pressures of about  $10^{-8}$  Torr for at least approximately 15 minutes as overwhelmingly suggested by the prior art of record.

For the above reasons, it is believed that the rejections should be sustained.

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Respectfully submitted,

Kenneth J. Ramsey  
Primary Examiner  
Art Unit 2879

A handwritten signature in cursive script that reads "Kenneth J. Ramsey".

kjr  
October 11, 2002

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